

## NOTES ON GEOGRAPHIC DISTRIBUTION

### Mammalia, Chiroptera, *Anoura fistulata* Muchhala, Mena-V & Albuja-V, 2005: Distribution extension

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*Anoura fistulata* Muchhala, Mena-V & Albuja-V, 2005 is among the rarest species of phyllostomid nectarivorous bats in Colombia, currently documented from one specimen collected on the eastern versant of the Colombian Andes in Llorente, Department of Nariño (0°49'0.00" N, 77°15'0.00" W) (Mantilla-Meluk and Baker 2008). *Anoura fistulata* was originally described from the Provincia Zamora Chinchipe, Condor Mirador (03°38'08" S, 78°23'22" W), at an elevation of 1,750 m above sea level, on the eastern side of the Andes, in Ecuador. *Anoura fistulata* represents one of the largest forms within the *A. caudifer* complex (*A. aequatoris* (Lönnberg, 1921), *A. cadenai* Mantilla-Meluk & Baker, 2006, *A. caudifer* (É. Geoffroy St.-Hilaire, 1818), *A. fistulata*, and *A. luismanueli* Molinari, 1994), which is composed by small-sized species with complete zygomata and well-developed uropatagium. Among *Anoura* species, *A. fistulata* is characterized by extreme morphological adaptations to nectarivory (Muchhala 2006). We report three additional records of *A. fistulata* for Colombia, one of them representing a geographic extension of the species by almost five degrees of latitude north of the currently northernmost known record of the species.

The northernmost record of *A. fistulata* is represented by a reproductively inactive adult female collected in Pueblo Rico, Department of Risaralda, on the road to La Bocatoma (5°14'18" N, 76°2'11" W) at 2,460 m, by G. Argüello on April 9, 1991 (Figure 1), and deposited in the scientific collections of the *Instituto de Ciencias*

*Naturales* (ICN), catalogue number ICN 11461. The specimen is preserved as skin and skull in excellent condition (Figure 2).

The second reported specimen (of undetermined sex) was collected by Paul Salaman on July of 1999 in the Department of Cauca, Serranía de Los Churumbelos, Municipio de Santa Rosa, Vereda La Petrolera, Tataui, 2,100 m (1°14'32.32" N, 76°30'28.34" W). The collecting site is characterized by typical Andean forests, which are dominated by the presence of *Quercus*, *Hediosmun*, and *Weinmannia* (Rangel et al. 1997). Records of *A. fistulata* from above 2,100 m are only reported from the isolated mountainous system of Volcán Sumaco, Napo Province, Ecuador (Lee et al. 2008). This specimen is deposited in the collections of the ICN, catalogue number ICN 19130. The specimen ICN 19130 was originally preserved in fluid. However, the skin decomposed and only the skull (some teeth missing) and whole skeleton were salvaged.

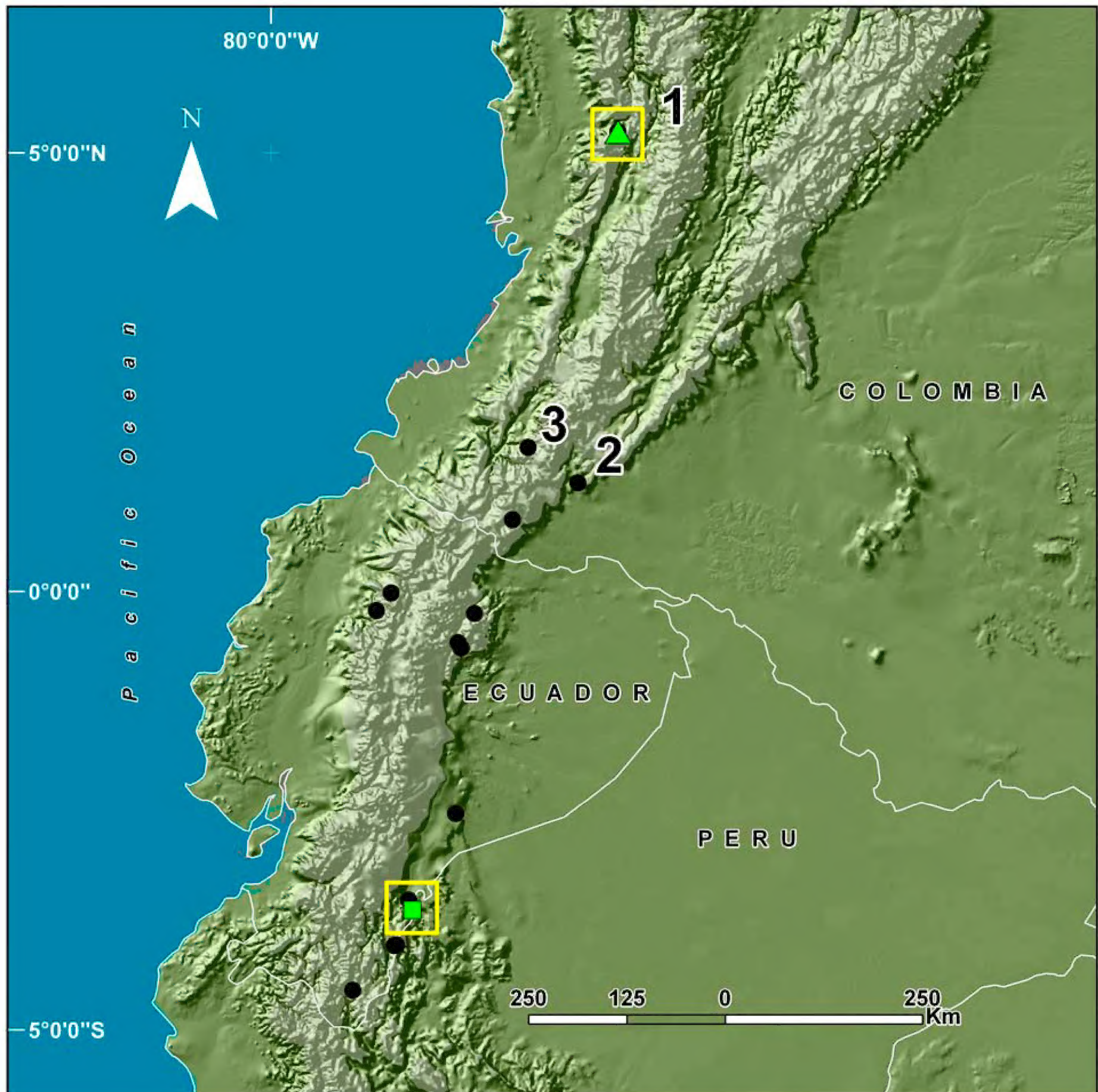
Due to their larger size, compared to *A. caudifer*, specimens ICN 11461 and ICN 19130 were originally catalogued as *Anoura geoffroyi* Gray, 1838. Both specimens, however, have an enlarged keel structure formed by the mental protuberance at the symphysis of the mandible, contrasting the relatively flat mental protuberance seen in *A. geoffroyi* (Figure 2). In addition, the skin of specimen ICN 11461 has a relatively large calcar (4.61 mm), an evident tail, which protrudes beyond the margin of the uropatagium, and a well-developed uropatagium (6.7 mm), with



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margin in the shape of an inverted “V”. The uropatagium of this specimen is also sparsely haired both dorsally and ventrally, and it presents a sparse fringe of hair along the anterior one-half of its margin (Figure 3), matching the description of *A. fistulata* (Muchhala et al. 2005). The above-

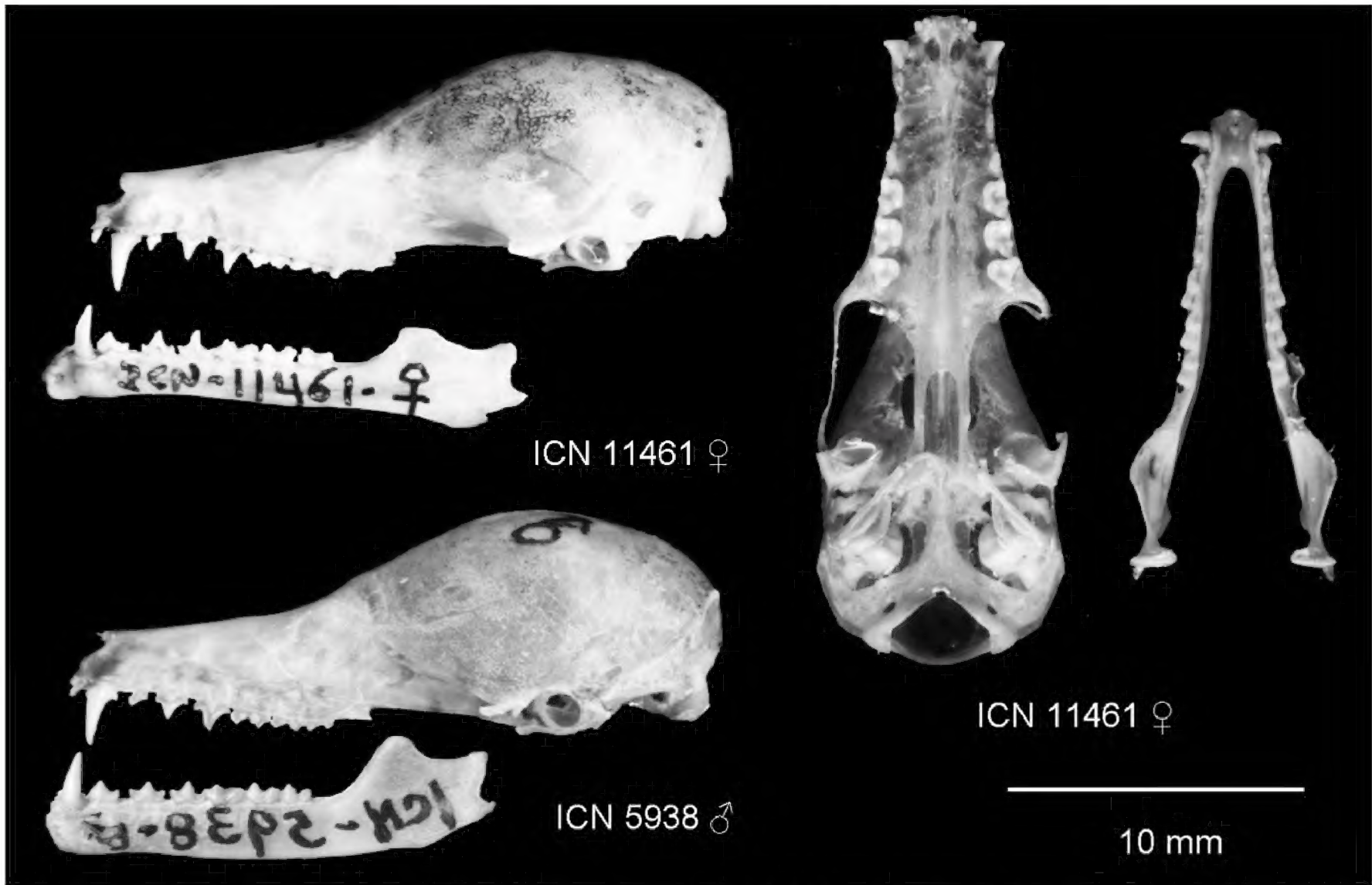
mentioned characteristics further differentiate *A. fistulata* from *A. geoffroyi*, which usually has narrow interfemoral membrane ( $< 4.5$  mm), poorly developed calcars ( $< 3.5$  mm), and tail always absent.



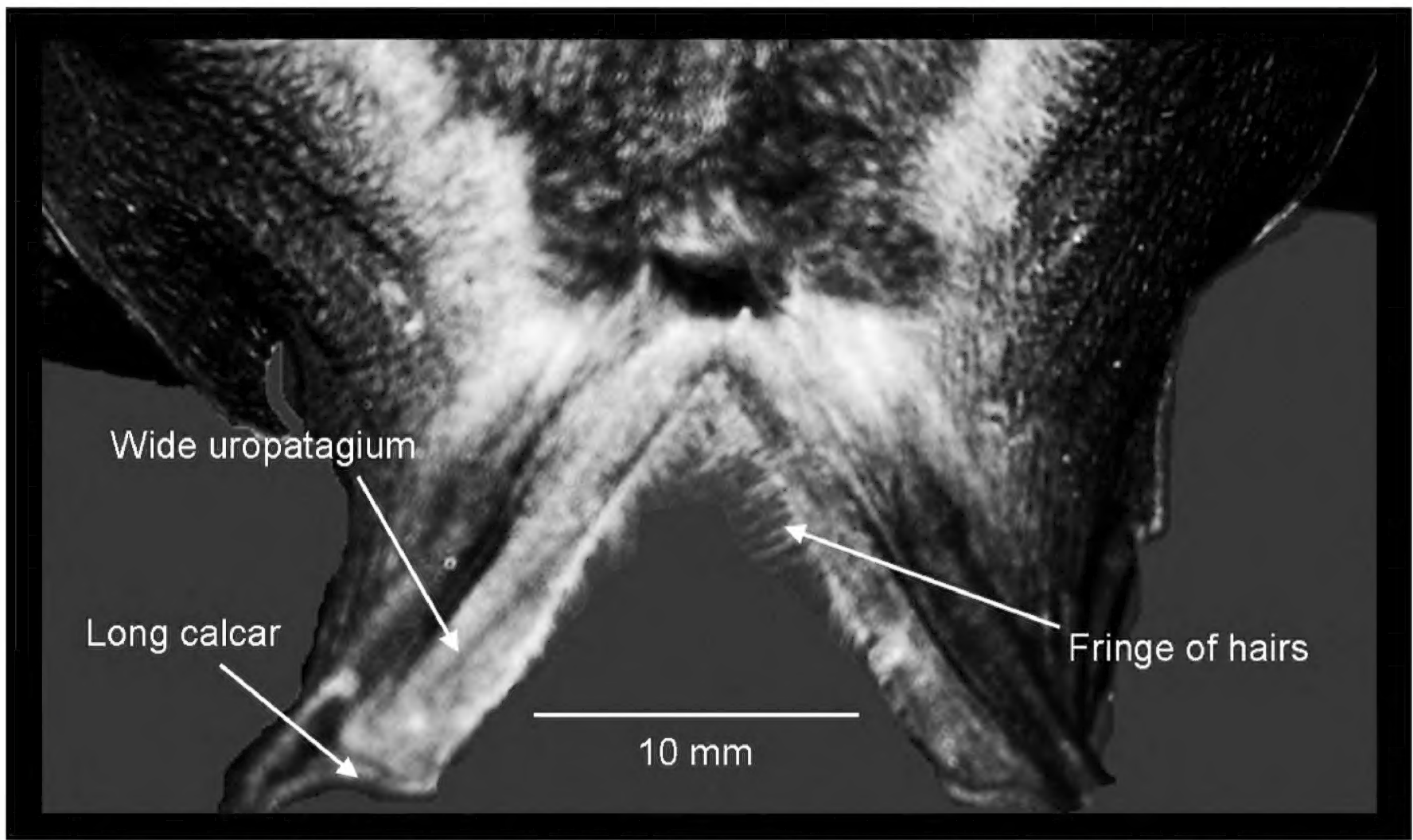
**Figure 1.** Black dots represent *Anoura fistulata* know localities. Numbers represent new reported records of *A. fistulata* for Colombia: 1) Northernmost record of *A. fistulata* in Pueblo Rico, Risaralda (green triangle), 2) Serranía de los Churumbelos, Cauca, and 3) Génova, Nariño. Type locality of the species represented by a green square.



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**Figure 2.** Lateral and ventral view of the skull and mandible of *A. fistulata* specimen ICN 11461 Å, from Pueblo Rico, Risaralda (upper row), and lateral view of skull and mandible, of *A. geoffroyi* specimen ICN 5938 Å from Colombia.



**Figure 3.** *Anoura fistulata* specimen ICN 19653, showing the typical inverted V shape uropatagium, characterized by the presence of a fringe of hairs which extends one half of the uropatagium, and long calcars (Picture taken by H. Ramírez-Chaves).

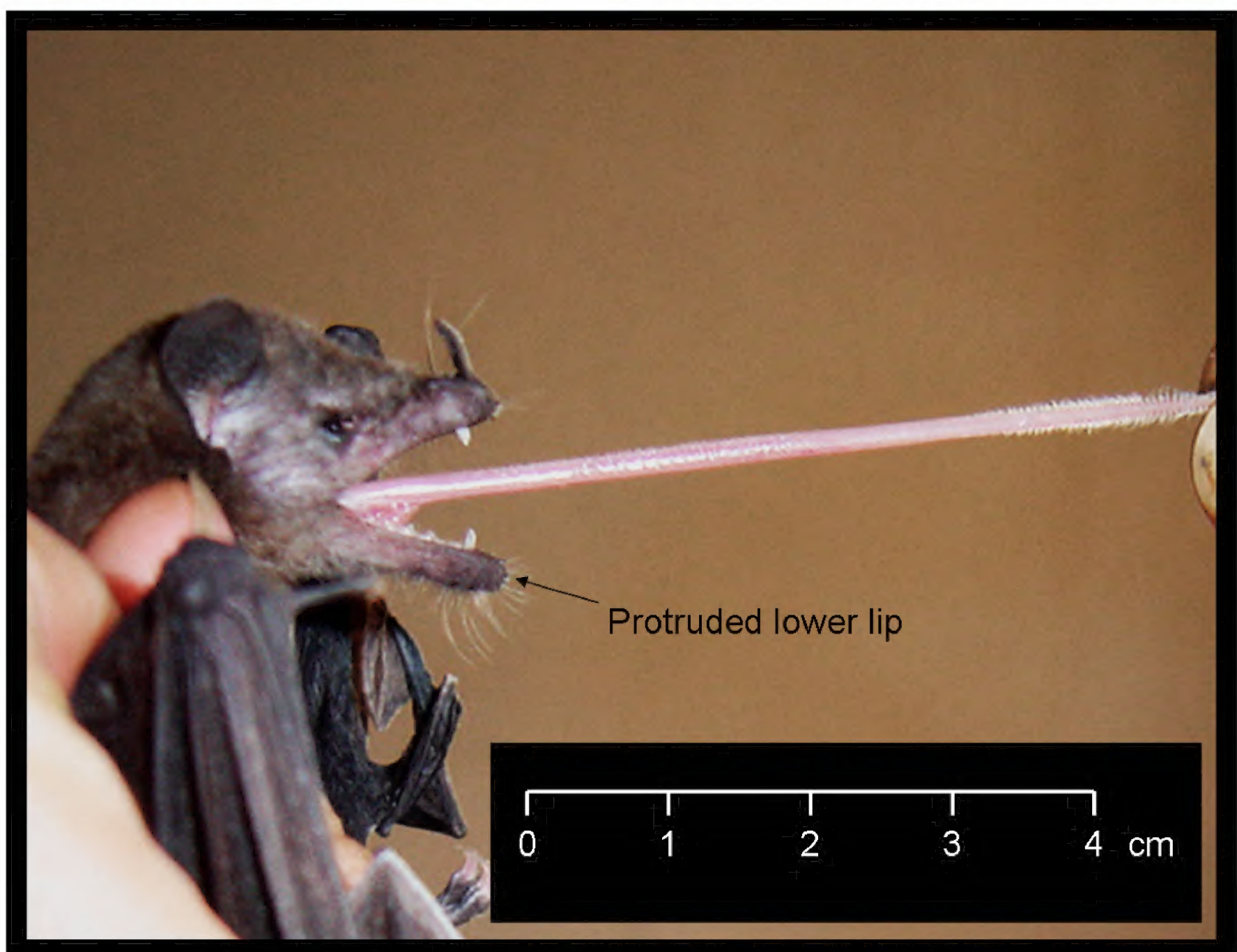


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The third reported *A. fistulata* locality is represented by a male specimen collected in Génova, Municipio de Colón, Vereda Bordo Alto, 1,979 m, Department of Nariño (1° 38' 47.00" N, 77° 1' 27.00" W) by C. Fernández-Rodríguez, on April 9, 2009, deposited in the collections of ICN, catalogue number ICN 19653. *Anoura fistulata* specimen ICN 19653 constitutes the first photographic documentation of the overextended tongue of a Colombian *A. fistulata* (Figure 4). An overextended tongue (71 mm) is considered as the most diagnostic character of *A. fistulata*, compared to the relatively short tongue of other species in the genus.

The herein reported specimens measurements (ICN 11461, ICN 19130, and ICN 19653) overlap mensural ranges reported for *A. fistulata* by Muchhala *et al.* (2005) and Mantilla-Meluk and Baker (2008) (Table 1).

Based on a niche modeling analysis, Mantilla-Meluk and Baker (2008) hypothesize that the eastern side of the Andes still exhibits the most suitable habitats for *A. fistulata*. The new sampling localities reported herein support Mantilla-Meluk and Baker (2008) inferences about this species and highlight the importance of conducting more systematic surveys in the Colombian Andes.



**Figure 4.** Partially extended tongue of *A. fistulata* (ICN 19653) from Génova, Nariño. Arrow showing the protruded lower lip of *A. fistulata* (Picture taken by H. Ramírez-Chaves).



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**Table 1.** Measurements of currently known specimens of *A. fistulata* from Colombia and the *A. fistulata* holotype from Ecuador. (\*) represents new specimens of *A. fistulata* in this work. GSL= greatest skull length, CB= condylobasal length, PAL= palatal length, PO= post-orbital width, ZB= zygomatic breadth, BW braincase width, MB= mastoid breath, CC= distance across the upper canines, MM= distance across the third upper molars, TR= longitude of the upper tooth-row, ML= mandible length, CM3= distance between the lower canine and the third lower molar, and FA= forearm length. All measurements in millimeters (mm), taken to the nearest 0.01 mm.

Measurement	Pueblo Rico Risaralda ICN 11461 *	Churumbelos Cauca ICN 19130 *	Génova Nariño ICN 19653. *	Llorente Nariño FMNH 113512	Holotype Condor Mirador (Ecuador)
GSL	24.99	24.32	23.62	24.08	23.5
CB	24.44	23.73	22.77	23.46	23.0
PAL	13.93	13.02	12.23	12.8	12.0
PO	4.53	5.00	4.77	4.83	4.5
ZB	-	10.08	-	9.89	9.8
BW	9.26	9.68	8.93	9.44	9.4
MB	8.60	10.19	9.81	9.02	-
CC	4.16	-	3.09	4.28	4.4
MM	5.86	5.16	4.19	5.47	5.9
TR	9.64	7.78	8.55	8.58	8.6
ML	13.87	17.68	16.71	17.13	17.0
C-M3	9.89	9.55	9.33	8.95	9.0
FA	38.66	36.89	36.80	37.8	37.2

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